

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

(A) IDENTIFICATION PAGE

Appln. No: 10/812,113
Appellant: Ming LI
Filed: March 29, 2004
Title: METHOD AND APPARATUS OF DRILLING HIGH DENSITY SUBMICRON CAVITIES
USING PARALLEL LASER BEAMS
T.C./A.U.: 1725
Examiner: Elve, Maria Alexandra
Confirmation No.: 1523
Notice of Appeal Filed: July 6, 2007
Docket No.: MATB-401US

REPLY BRIEF UNDER 37 CFR § 41.41

Mail Stop Appeal Brief-Patents

Commissioner for Patents
P. O. Box 1450
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S I R :

In response to the EXAMINER'S ANSWER of April 2, 2008, Appellant is submitting this Reply Brief for the above-identified application.

The EXAMINER'S ANSWER of April 2, 2008, contains two (2) new grounds for rejection. Appellant elects to MAINTAIN THE APPEAL by filing this Reply Brief under 37 CFR 41.41.

(B) STATUS OF CLAIMS PAGE

Claims 1, 5-14, 16-20, 22, 23, 25-29, and 32-34 are pending in this application.

Claims 1, 5-14, 16-20, 22, 23, 25-29, and 32-34 stand rejected. Claims 1, 5-14, 16-20, 22, 23, 25-29, and 32-34 are appealed. Of those claims currently under appeal, claims 1, 5, 8, 11, 17, 20, 23, 26, and 32 are independent.

(C) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL PAGES

The following four (4) rejections of record are to be reviewed on appeal. All of these rejections are rejections 35 U.S.C. § 103(a). The last two (2) rejections (rejections #3 and 4) were new grounds for rejection contained in the Examiner's Answer.

The Examiner relies of various combinations of five (5) different references for the four (4) rejections under 35 U.S.C. § 103(a): Liu et al., U.S. Patent 6,433,303 ("Liu I"); Liu et al., U.S. Patent 6,433, 305 ("Liu II"); Smith, U.S. Patent 5,296,673 ("Smith"); Noddin, U.S. Patent 5,973,290 ("Noddin"); and Nakatani et al., U.S. Patent 5,811,754 ("Nakatani et al."). There are two sets of two rejections, each under 35 U.S.C. § 103(a). The first set of two rejections relies on Liu I in view of either: 1) Liu II and Smith; or 2) Nakatani et al., Liu II, and Smith. The second set relies on Liu I in view of either: 1) Liu II, Smith, and Noddin; or 2) Nakatani et al., Liu II, Smith, and Noddin.

Specifically, the four (4) rejections of record to be reviewed on appeal are:

- (1) The rejection of claims 1, 5, 7-14, 17-20, 22, 23, 25-29, and 32-34 under 35 U.S.C. § 103(a) as unpatentable over Liu I in view of Liu II and Smith.
- (2) The rejection of claims 6 and 16 under 35 U.S.C. § 103(a) as unpatentable over Liu I in view of Liu II and Smith and further in view of Noddin.
- (3) The rejection of claims 1, 5, 7-14, 17-20, 22, 23, 25-29, and 32-34 under 35 U.S.C. § 103(a) as unpatentable over Liu I in view of Nakatani et al., Liu II, and Smith.
- (4) The rejection of claims 6 and 16 under 35 U.S.C. § 103(a) as unpatentable over Liu I in view of Nakatani et al., Liu II, Smith, and Noddin.

(D) ARGUMENT PAGES

For ease of reference, the page and line numbers that appear in the headings refer to the section of the Examiner's Answer in which the Examiner's arguments to which appellant is responding appear. Because the Examiner had not previously responded to most of appellant's arguments, appellant has not previously had an opportunity to respond to most of the Examiner's arguments. Therefore, it is necessary for appellant to make detailed responses to many of the Examiner's arguments.

Note that citations to the application's support for claimed subject matter are made by reference to page (pg.) and line numbers (lines) of Appellant's specification (AS) as originally filed (e.g., AS pg. 4, lines 12-15) as well as corresponding figures (Figs.).

A. RESPONSE TO THE NEW GROUNDS FOR REJECTION (page 4, line 1, to page 7, line 8)

Previously, claims 1, 5, 7-14, 17-20, 22, 23, 25-29, and 32-34 were rejected as unpatentable over Liu I in view of Liu II and Smith and claims 6 and 16 were rejected as unpatentable over Liu I in view of Liu II and Smith and further in view of Noddin. In the Examiner's answer, the Examiner has added Nakatani et al. to each of these rejections.

Claim 1 is an independent claim that broadly recites a laser micromachining system for drilling holes in a work piece. AS pg. 4, lines 4-25; Fig. 1. Claims 5, 8, and 20 are independent claims that broadly recite laser micromachining systems similar to the system of claim 1. Claims 6, 7, 9, and 10 are dependent claims that depend from claim 1. Claim 22 is a dependent claim that depends from claim 20.

Claim 11 is an independent claim that broadly recites a laser micromachining system for drilling holes in a work piece. AS pg. 4, line 26, through pg. 5, line 11; Fig. 8.

Claims 12-14, 16, 18, and 19 are dependent claims that depend from claim 11.

Claim 17 is an independent claim that broadly recites a laser micromachining system for drilling holes in a work piece. AS pg. 4, line 26, through pg. 5, line 11; Fig. 8.

Claim 23 is an independent claim that broadly recites a laser micromachining system for drilling holes in a work piece. AS pg. 4, line 26, through pg. 5, line 11; Fig. 8.

Claim 25 is a dependent claim that depends from claim 23.

Claim 26 is an independent claim that broadly recites a method of drilling holes in a work piece. AS pg. 5, lines 12-28; Fig. 10. Claims 27, 28, and 34 are dependent claims that depend from claim 26.

Claim 32 is an independent claim that broadly recites a method of drilling holes in a work piece. AS pg. 5, lines 12-23; Fig. 10. Claims 29 and 33 are dependent claims that depend from claim 1.

The first of the new grounds for rejection will be addressed in two sections due to differences in the features recited in the independent claims. The second of the new grounds for rejection will be addressed in the third section below.

1. Rejection of claims 1, 5, 7, 9-14, 18, 19, 29, 32, and 33 as unpatentable over Liu I in view of Nakatani et al., Liu II, and Smith

For the following reasons, this rejection should be reversed.

- a. *The Examiner's reasoning for combining Nakatani et al. with Liu I is incorrect.*

In *KSR International Co. v. Teleflex Inc. et al.*, 550 U.S. ____ (2007), the Supreme Court reiterated that "rejections on obviousness grounds cannot be sustained by mere

conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *Id.* at 14 (citing *In re Kahn*, 441 F. 3d 977, 988 (CA Fed. 2006)).

At page 5, lines 10-13, of the Examiner's Answer states that it would have been obvious to modify the primary reference, Liu I to include the features of Nakatani et al. "because the greater mobility would improve the circularity of the exit holes and reduce the taper of the holes." To support this assertion the Examiner cites column 6, lines 15 and 16, of Liu I; however, these lines disclose that it may be desirable to include "a rotating half wave or similar device" to "improve the circularity of the exit holes and possibly reduce the taper of the holes." This disclosure in Liu I is directed toward controlling the polarization of the laser beam used in the laser machining apparatus disclosed by Liu I to improve the machining quality achieve by this apparatus. This disclosure by Liu I has nothing to do with the potential "greater mobility" of the laser sub-beams that may be achieved by adding a motion stage to move the mask as disclosed in Nakatani et al.

Further, the combination of these features (or any other features) disclosed by Nakatani et al. would not "improve the circularity of the exit holes and reduce the taper of the holes" machined by a system might result from the proposed combination as compared to the system disclosed by Liu I.

Each hole machined by the system of Liu I corresponds to one opening in mask 120 which is imaged on workpiece 130. Col. 3, lines 6-11, and Figs. 1 and 2. The system of Liu I is designed to accurately reproduce the pattern of holes in the mask on the workpiece. See Col. 4, lines 32-34, and Figs. 6 and 7.

Combining the feature of moving the mask disclosed by Nakatani et al. would allow the mask to be moved both when the hypothetical system was laser machining a workpiece and when it was not laser machining a workpiece.

Liu I discloses that the circularity of the exit holes and possibly their taper may be improved by controlling the polarization of the laser beam at the workpiece. Col. 6 lines 13-16. It is noted, however, that moving the mask in the system of Liu I would not have the effect of controlling the polarization of the sub-beams formed by the mask. If the mask is only moved when the system is not machining a workpiece (i.e. between the drilling of patterns of holes on the workpiece), then this feature will have no effect on the actual process of forming the holes and, therefore, cannot "improve the circularity of the exit holes and reduce the taper of the holes" machined by the system.

Moving the mask during the laser machining process, however, would cause the image of the mask formed on the workpiece to move so that pulses of laser energy would fall on different locations on the workpiece. Rather than "improving the circularity of the exit holes," as the Examiner has asserted, moving the mask during the laser machining process would reduce the accuracy with which the pattern of the mask could be reproduced on the workpiece.

In addition to the polarization of the laser beam, the taper of the holes depends on the cone angle of the laser beam at incidence with the workpiece. The cone angle of the focused laser beam depends on the objective lens used to focus the beam. Therefore, moving the mask will not change the taper of the holes produced.

Therefore, Appellants respectfully submit that the Examiner's articulated reasoning does not provide a "rational underpinning" to support making the combination of Nakatani

et al. with Liu I. The reason for combining references as part of a *prima facie* case of obviousness must be based on substantial evidence. In the case of the present rejection, not only is the evidence provided to support combining Nakatani et al. with Liu I not substantial, but it is incorrect.

The Examiner admits, "[a]lthough [Liu I] teaches the translation of the workpiece stage in order to form an array of microcavities on the workpiece; motion of the mask is not taught." Examiner's Answer page 5, lines 1-2. Claims 1, 5, 7, 9-14, 18, 19, 29, 32, and 33 of Appellants' application each include this feature of moving the mask, however. Independent apparatus claim 1 explicitly recites that this "translation stage [is] coupled to the image interpolating mask for moving the image interpolating mask and the array of sub-beams in a perpendicular direction to the optical path..." Independent apparatus claims 5 and 11 both recite the feature of "a translation stage configured to move the array of sub-beams in a perpendicular direction to the optical path..." Independent method claim 32 recites "translating the array of sub-beams N times in a perpendicular direction to the optical path..." The only means disclosed for moving, or translating, the array of sub-beams in a perpendicular direction to the optical path is by moving, or translating, the image interpolating mask, or diffractive optics element, used to create the array of sub-beams.

The Examiner has cited Nakatani et al. to overcome this admitted deficiency of Liu I with respect to the claims 1, 5, 7, 9-14, 18, 19, 29, 32, and 33 of Applicant's application. Liu I, Liu II, and Smith, singly or in combination, do not disclose or suggest this feature. Therefore, because the Examiner has not provided a rational underpinning to support the combination of Nakatani et al. with Liu I, Appellants respectfully submit that the Examiner has not made the *prima facie* case of obviousness in this rejection.

b, Liu II teaches away from the invention as recited in claims 1, 5, 7, 9-14, 18, 19, 29, 32, and 33

Even if it is accepted that it would have been obvious to modify Liu I to include the features of Nakatani et al., the Examiner's Answer does not address a feature recited in claims 1, 5, 7, 9-14, 18, 19, 29, 32, and 33, namely that the array of sub-beams formed by the mask, or diffractive optical element, is only a portion (a "sub-pattern") of the reduced-size pattern to be formed on the work piece. Further, this feature is incompatible with the teachings of Liu II.

Applicants wish to briefly describe Nakatani et al. as the reference has not been previously cited in this case and, thus, has not been previously discussed by Applicants. Nakatani et al. disclose an optical processing apparatus in which a light beam is transmitted through mask 3 and imaging lens 5 to form a pattern image of the mask on workpiece 7, as shown in Fig. 1. Abstract. Mask moving mechanism 4 and synchronous mask moving mechanism 42 are used move mask 3 perpendicular to the optical axis. These mask moving mechanisms may provide synchronous motion of mask 3 with workpiece 7 and fine position adjustment of the mask. Col. 14, lines 35-50. Nakatani et al. also discloses that their system may be effective for forming holes with a diameter of 20 μ m or less and a positional accuracy of $\pm 5\mu$ m using a KrF excimer laser with a wavelength of 248 nm. Col. 35, lines 32-35 and 45-47.

Independent apparatus claim 1 explicitly recites that "the array of sub-beams being a sub-pattern of a reduced-size pattern formed on the work piece..." Independent apparatus claims 5 and 11 both recite the feature that "the array of apertures of the image interpolating mask has an aperture density of 1/N times an image density of the reduced-size pattern on the work piece times a demagnification factor of the demagnifier, N being a

positive integer..." Independent method claim 32 recites the feature that "the array of sub-beams having a density of $1/N$ times an image density of a reduced-size pattern to be formed on the work piece times a demagnification factor, N being a positive integer ..."

Thus, each of these independent claims recites the feature that the array of sub-beams formed by the mask, or diffractive optical element, is only a portion (a "sub-pattern") of the reduced-size pattern to be formed on the work piece.

The Examiner's Answer asserts that the combination of Liu I and Nakatani et al. disclose the concept of using a mask to form a pattern on a workpiece. Page 4, line 4, through page 5, line 9. The Examiner's Answer admits that Liu I does not teach the sub-wavelength pitch of the reduced image pattern recited in claims 1, 5, 7, 9-14, 18, 19, 29, 32, and 33. Page 5, line 14. Appellants note that, although not explicitly admitted by the Examiner, neither Nakatani et al. nor Smith et al. disclose or suggest the formation of patterns with a sub-wavelength pitch using laser machining. Thus, the Examiner's Answer cites only Liu II as disclosing the concept of laser machining a series of holes that have a pitch less than the wavelength used, as recited in claims 1, 5, 7, 9-14, 18, 19, 29, 32, and 33.

First, Appellants respectfully submit that these two concepts (using a mask to form a pattern on a workpiece and laser machining a series of holes that have a pitch less than the wavelength used) would not have rendered it obvious to a person of ordinary skill in the art to separate a desired pattern into a number of sub-pattern that overlap to form the reduced-size pattern on the workpiece with a sub-wavelength pitch between features.

Second, Liu II addresses single beam laser machining. See Fig. 2. Liu II discloses the difficulties of forming consistent holes with a sub-wavelength pitch due to the heat affected zones that are created around earlier machined holes. Col. 2, line 51, through

Col. 3, line 15. Liu II teaches that, to the extent possible, it is preferable to drill holes in positions that are not in the laser hardened zones of previously drilled holes. Col. 3, lines 51-57. Liu II does not disclose methods of laser machining utilizing arrays of sub-beams to drill holes in parallel; however, based on this disclosure, a person of ordinary skill in the art would view Liu II as teaching that it would be preferable to form all of the holes in a pattern at once if possible, so that there would be no laser hardened zones of previously drilled holes to take into account.

Therefore, Appellants respectfully submit that the disclosures of Liu II teach away from separating a pattern to be formed on a workpiece into overlapping sub-patterns to achieve a sub-wavelength pitch, as recited in claims 1, 5, 7, 9-14, 18, 19, 29, 32, and 33. A reference that teaches away from a claimed invention cannot be combined with other references make it obvious. Thus, Liu I, Nakatani et al., Liu II, and Smith, singly or in combination, do not teach or suggest this feature of the claimed invention.

For this additional reason, the Examiner has not made the *prima facie* case for obviousness and the new rejection of claims 1, 5, 7, 9-14, 18, 19, 29, 32, and 33 as unpatentable over Liu I in view of Nakatani et al., Liu II, and Smith should be reversed.

2. Rejection of claims 8, 17, 20, 22, 23, 25-28, and 34 as unpatentable over Liu I in view of Nakatani et al., Liu II, and Smith

For the following reason, this rejection should be reversed.

As discussed above, Appellants respectfully submit that the Examiner's articulated reasoning does not provide a "rational underpinning" to support making the combination of Nakatani et al. with Liu I.

The Examiner admits, "[a]lthough [Liu I] teaches the translation of the workpiece

stage in order to form an array of microcavities on the workpiece; motion of the mask is not taught." Examiner's Answer page 5, lines 1-2. Independent apparatus claims 8, 17, 20, and 23 all recite the feature of "a translation stage configured to move the array of sub-beams in a perpendicular direction to the optical path..." Independent method claim 26 recites "translating the array of sub-beams in a perpendicular direction to the optical path..." The only means disclosed for moving, or translating, the array of sub-beams in a perpendicular direction to the optical path is by moving, or translating, the image interpolating mask, or diffractive optical element, used to create the array of sub-beams.

The Examiner has cited Nakatani et al. to overcome this admitted deficiency of Liu I with respect to claims 6 and 16 of Applicant's application. Liu I, Liu II, and Smith, singly or in combination, do not disclose or suggest this feature. Therefore, because the Examiner has not provided a rational underpinning to support the combination of Nakatani et al. with Liu I, Appellants respectfully submit that the Examiner has not made the *prima facie* case of obviousness in this rejection. Thus, the new rejection of claims 8, 17, 20, 22, 23, 25-28, and 34 as unpatentable over Liu I in view of Nakatani et al., Liu II, and Smith should be reversed.

3. Rejection of claims 6 and 16 as unpatentable over Liu I in view of Nakatani et al., Liu II, Smith, and Noddin

Claims 6 and 16 were rejected under 35 U.S.C. § 103(a) as unpatentable over Liu I in view of Nakatani et al., Liu II, Smith, and Noddin. This rejection is similar the previous rejection, the rejection of claims 1, 5, 7-14, 17-20, 22, 23, 25-29, and 32-34 as unpatentable over Liu I in view of Nakatani et al. and Smith, except that Noddin has been added to address specific features in these dependent claims.

For the following reasons, this rejection should be reversed.

a. *The Examiner's reasoning for combining Nakatani et al. with Liu I is incorrect.*

As discussed above, Appellants respectfully submit that the Examiner's articulated reasoning does not provide a "rational underpinning" to support making the combination of Nakatani et al. with Liu I.

The Examiner admits, "[a]lthough [Liu I] teaches the translation of the workpiece stage in order to form an array of microcavities on the workpiece; motion of the mask is not taught." Examiner's Answer page 5, lines 1-2. Claims 6 and 16 of Appellants' application depend from claims 1 and 11, respectively. Thus, each includes this feature of moving the mask. The Examiner has cited Nakatani et al. to overcome this admitted deficiency of Liu I with respect to claims 6 and 16 of Applicant's application. Liu I, Liu II, Smith, and Noddin, singly or in combination, do not disclose or suggest this feature.

Therefore, because the Examiner has not provided a rational underpinning to support the combination of Nakatani et al. with Liu I, Appellants respectfully submit that the Examiner has not made the *prima facie* case of obviousness in this rejection.

b, *Liu II teaches away from the invention as recited in claims 6 and 16*

As discussed above, even if it is accepted that it would have been obvious to modify Liu I to include the features of Nakatani et al., the Examiner's Answer does not address a feature recited in claims 6 and 16, namely that the array of sub-beams formed by the mask, or diffractive optical element, is only a portion (a "sub-pattern") of the reduced-size pattern to be formed on the work piece. Further, this feature is incompatible with the teachings of Liu II.

Noddin does not disclose or suggest the formation of patterns with a sub-wavelength pitch using laser machining. Thus, the Examiner's Answer cites only Liu II as disclosing the concept of laser machining a series of holes that have a pitch less than the wavelength used, as recited in claims 6 and 16. A reference that teaches away from a claimed invention cannot be combined with other references make it obvious. Thus, Liu I, Nakatani et al., Liu II, Smith, and Noddin, singly or in combination, do not teach or suggest this feature of the claimed invention.

For this additional reason, the Examiner has not made the *prima facie* case for obviousness and the new rejection of claims 6 and 16 as unpatentable over Liu I in view of Nakatani et al., Liu II, Smith, and Noddin should be reversed.

B. RESPONSE TO THE EXAMINER'S "RESPONSE TO ARGUMENTS"

Appellant notes that the Examiner has included the new reference Nakatani et al. in their discussion of Appellants arguments. Appellant has not addressed this reference here as they have already addressed it above in the Response to New Grounds of Rejection.

1. Rejection of claims 1, 5, 7-14, 17-20, 22, 23, 25-29, and 32-34 as unpatentable over Liu I in view of Liu II, and Smith

Appellant made one argument against this combination of references, that one feature of these claims was not disclosed or suggested by these references, singly or in combination, specifically, the use of a translation means to move the array of sub-beams in a direction perpendicular to the optical path in the claimed invention. The Examiner's arguments will be addressed in order.

a. The Examiner asserts that motion of the work piece is equivalent to motion of the array of sub-beams (page 7, line 13, through page 8, line 10)

The Examiner's position is that Liu I "does teach the formation of an array of sub-beams and workpiece is mounted on to a translation stage." Examiner's Answer, page 7, lines 16-17. The Examiner notes that the mask and the stage are perpendicular to the optical axis and that "[t]here is motion albeit the motion of the stage and not the mask directly." Examiner's Answer, page 7, lines 18-19.

Appellants agree that translation stage 128, shown in Figs. 1, 2, and 3 of Liu I, allow the workpiece to be moved perpendicular to the optical axis; however this motion is not equivalent to moving the array of sub-beams perpendicular to the optical axis as recited in claims 1, 5, 7-14, 17-20, 22, 23, 25-29, and 32-34. In Appellants' invention, the sub-beams pass through a demagnifier between the mask, or diffractive optical element (DOE) and the workpiece. This demagnifier has the effect of demagnifying the

movements of array of sub-beams perpendicular to the optical axis caused by translating the mask, or DOE. This results in improved precision and accuracy when moving the array of sub-beams from one position to another to form the separate sub-patterns of the reduced size image. Thus, motion of the workpiece is not equivalent to motion of the array of sub-beams in Appellants' invention.

The Examiner also points out that Appellants had misunderstood a statement made by the Examiner in a previous Response to Arguments provided by the Examiner. The Examiner clarifies that this statement was meant to explain Examiner's position that motion of the mask and motion of the workpiece are in Liu I are equivalent and not to be a characterization of Smith as Appellants suggested. Based on this clarification, Appellants allow that in the system of Liu I the relative motion of the array of sub-beams and workpiece may be the same whether the mask (or DOE) or the workpiece is moved; however, as described above, this is not the case in Appellants invention.

b. The Examiner alleges that Appellants have argued against the references individually (page 8, line 20, through page 9, line 10)

The Examiner's position is that the Appellants have argued against the references individually. Examiner's Answer, page 8, line 20, through page 9, line 4. This is incorrect. No such argument was ever made by Appellants. Appellants have argued that at least one feature recited in the claims is not disclosed or suggested by the cited references, singly or in combination, and that, thus, the Examiner has failed to set forth a *prima facie* case of obviousness. As part of this argument, Appellants have pointed out that each reference does not teach or suggest the recited feature.

In the case of Liu II, Appellants have noted that, because this reference does not disclose the use of an array of sub-beams, it cannot disclose or suggest moving an array

of sub-beams perpendicular to an optical path. In the case of Smith, Appellants have noted that, although this reference discloses moving a mask parallel to the optical path, it does not disclose or suggest moving an array of sub-beams perpendicular to an optical path. These points are only part of Appellants argument, however, that Liu I, Liu II, and Smith, singly or in combination, do not teach or suggest this feature. Neither of these points is, as the Examiner implies, the entirety of one of Appellants' arguments.

Appellants also note that the Examiner, describing Smith, states that "instant claims state that the image mask is moved." Appellants agree that claim 2 of Smith does recite "movement of the mask along the projection path" (i.e. parallel to the optical path); however, Appellants respectfully submit that motion of a mask parallel to an optical path is not equivalent to motion of the mask perpendicular to the optical path.

2. Rejection of claims 6 and 16 as unpatentable over Liu I in view of Liu II, Smith, and Noddin

Appellant made one argument against this combination of references, that one feature of these claims was not disclosed or suggested by these references, singly or in combination, specifically, the use of a translation means to move the array of sub-beams in a direction perpendicular to the optical path in the claimed invention.

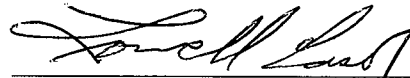
The Examiner's position is the same as described above, i.e. that motion of the stage is equivalent to motion of array of sub-beams. Examiner's Answer, page 9, lines 19-20.

Appellants respectfully disagree for the same reasons stated above.

E. CONCLUSION

Appellants have advanced reasons demonstrating that the disclosures of Liu I, Nakatani et al., Liu II, Smith, and Noddin are insufficient as a basis for a *prima facie* case of obviousness of the pending claims. For these reasons, and for the reasons given in Appellants' Appeal Brief, the rejections of record, including the new grounds for rejection, Appellants respectfully request the Board's reversal of these rejections.

Respectfully submitted,



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